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DEVELOPING A VIRTUAL SPECTROPHOTOMETER USING WEB LANGUAGES

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ABSTRACT

In this project we have developed a virtual spectrophotometer in which the color measurements can be done without the use of hardware devices. This project tends to virtually calculate the color values with the given input and will provide the precise output of the respective experiment that is performed by the end-user. We have implemented five parameters and they are Automatic density, Density CMYK, Dot area, Trapping, and Print Curve. By this, our project will give a pace of experiencing a spectrophotometer with the color values of the printed sample virtually. Hence this virtual platform will give a deep knowledge regarding the working of a spectrophotometer to the user before hand of using the manual spectrophotometer.

Keywords:- Virtual platform, spectrophotometer, parameters, hardware device.

I INTRODUCTION

In the printing industry, a spectrophotometer is the device that is used for measuring color parameters using the principle of light reflection and absorption for the printing material and samples. The main point is that in the optical path the reflected light is separated by very narrow band filters into spectral samples spaced 10nm to 20nm apart. The main factors involved in this study are the Lightness(L*), Chroma (C*), and hue angle (h°) of a color sample where L* – the value of the Lightness of color sample relating to lightness or darkness without regard to color. C* – a measure of the saturation of a color or intensity of a color. h° – the quality of color in terms of the primary colors red, yellow, green, and blue. It is the work undergone by Alfred Munsell and others which that attempted to organize the color that they saw in nature

HTML stands for HyperText Markup Language and it is the language that is used to define the structure of a web page. HTML is used along with CSS and JavaScript to design web pages. HTML is the basic building block of a website [1]..JavaScript is light weighed cross-platform and an interpreted scripting language [2]. CSS has different attributes and elements for various properties. Each and every element has an opening and a closing tag. CSS stands for Cascading Style Sheets and it is used to style web documents [3]. Variations in the offset print quality is related to numerous parameters in printing press and paper. To maintain the constant quality of products, press operators need to assess, explore and monitor print quality [4]

II METHODOLOGY

The workflow of our project to derive the output values of the parameters in the spectrophotometer is shown in fig.1. It first begins with a title page, then to a login page and once the access is given its is redirected to the experimental setup page, and the progress of the parameter analysis is undergone.

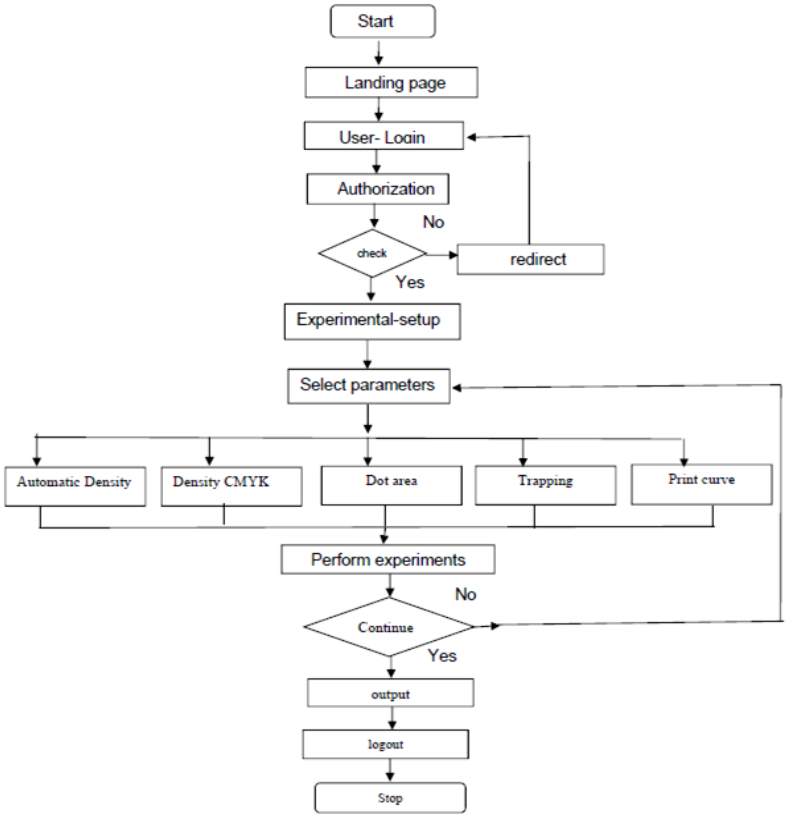

Fig. 1. Workflow of web page

The languages that we have used to develop the virtual lab include HTML, CSS, and JavaScript in which, HTML possesses the priority, then followed by CSS and JavaScript respectively.

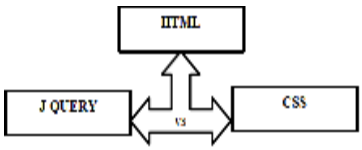

Fig. 2.Web Languages

III IMPLEMENTATION AND TESTING PROCEDURE

Code snippets are the programming language used in creating the web application of the project. The programming languages used are HTML,CSS, JavaScript and bootstrap. The HTML is used for structuring the application. The CSS is used for styling the application. JavaScript is used for animating the application.

Testing Procedure:
The type of operation performed in all the parameters is embedded with the style sheets using the web languages of HTML, CSS, and JavaScript. Each of the parameters is added with different entities of its corresponding data. The color patch that is provided at the top-right corner of the development page is the key resource for all the experimental analysis of parameters.

Finding Automatic Density:
The first parameter that can be performed in the platform is the Automatic Density. The right corner consists of a color patch followed by 12 colors. Also, the history of colors that will be displayed are shown below the display panel.

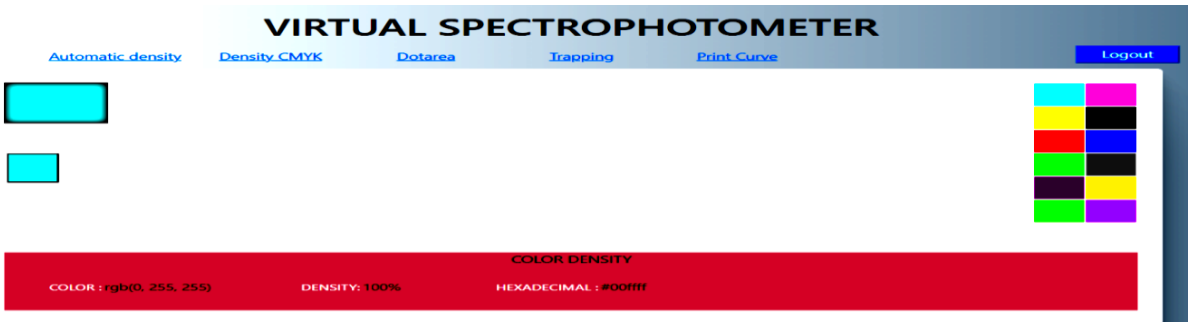

Fig.3. Automatic Density

Density CMYK:

The second parameter followed by Automatic density is the Density CMYK. In this parameter, the selected color values of corresponding Cyan, Magenta, Yellow, Black will be displayed (Fig.4)

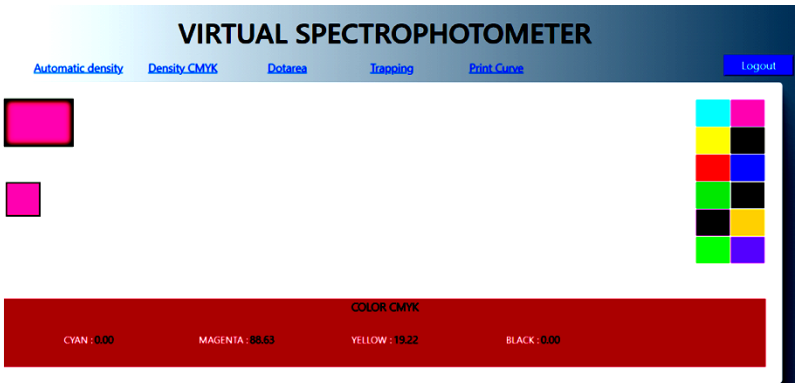

Fig.4. Density CMYK

Measuring Dot Area:

In this parameter, the required dot gain is displayed in the percentage scale. If the user wants to perform different colors, then they can select the other color from the color patch at the right corner of the platform shown in fig.5

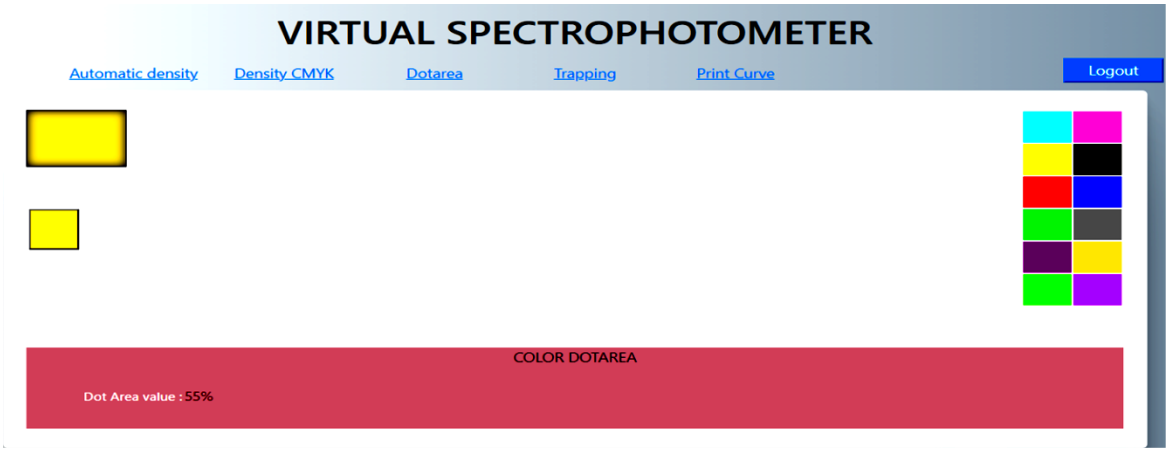

Fig. 5. Dot Area

Finding Trapping:

This parameter requires two corresponding colors to be selected for displaying the output dot gain value. The result that will be displayed is the trapped color of 1st color over the 2nd color(Fig.6)

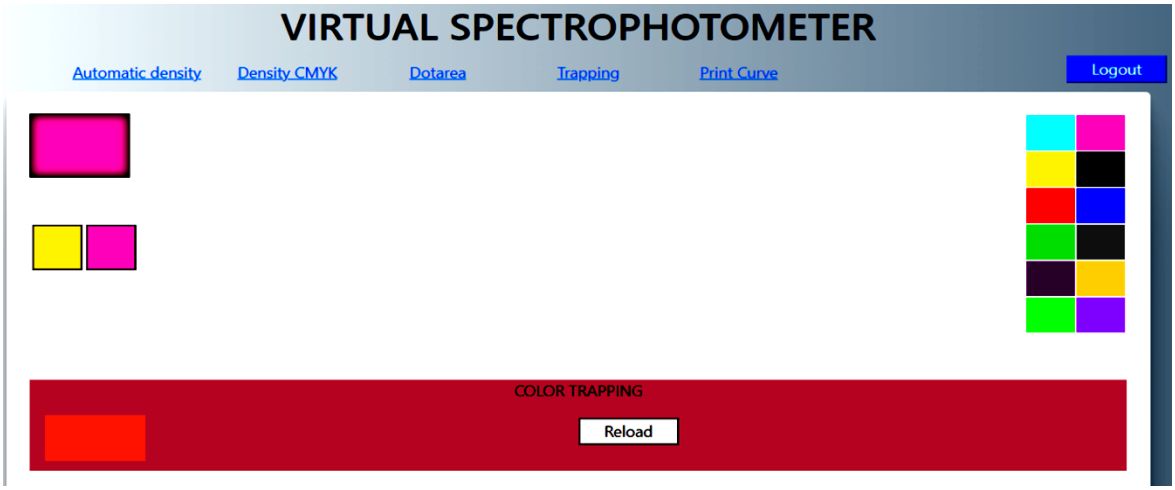

Fig. 6. Finding Trapping

Calculating Print Curve:

The final parameter that is developed in the platform is the Print Curve. Here the graphical representation of the selected color values will be displayed and is shown in Fig.7

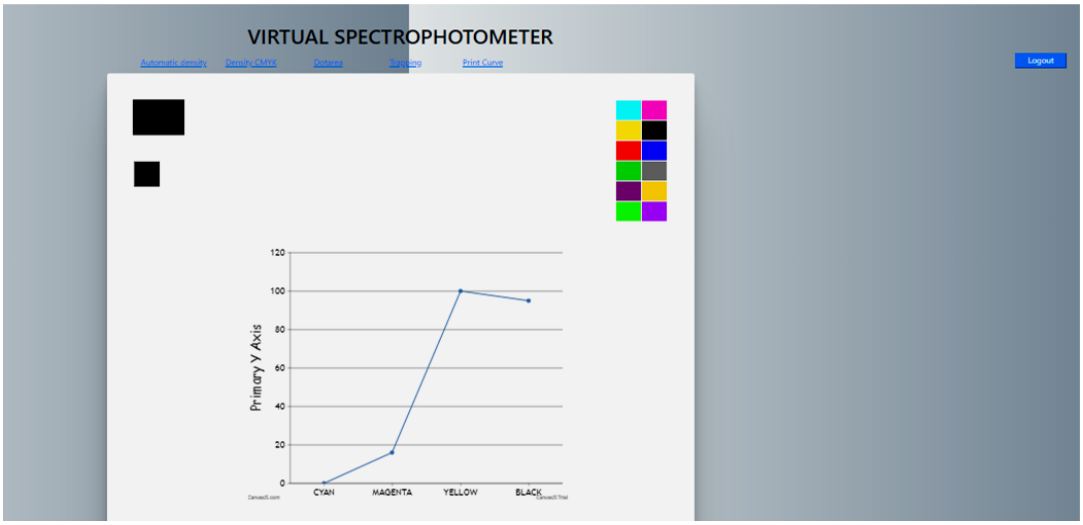

Fig. 7 Calculating Print Curve

IV RESULTS

Spectrophotometer devices are used in all printing sectors to measure the accuracy of the color values. The spectrophotometer which is virtually designed is made to give knowledge about the working and the use of the device. Hence this virtual spectrophotometer helps people to get a sense of the usage of the spectrophotometer before the actual usage of the device.

V CONCLUSION

We conclude that the integrated system will be more efficient in conveying and delivering the information to the target people. This project is made with pre-planning, and it provides flexibility and economical operation. This type of innovation had made it more desirable and economical

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